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10/699,779	11/04/2003	Kenji Inoue	P03344-US DIV	5901

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EXAMINER	
SUMMONS, BARBARA	
ART UNIT	PAPER NUMBER
2817	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/699,779	INOUE, KENJI	
	Examiner	Art Unit	
	Barbara Summons	2817	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 November 2003 (pre-amendment)*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20 and 26-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *15-20* is/are allowed.

6)☒ Claim(s) *1,3-11,13,14,27-29 and 31-33* is/are rejected.

7)☒ Claim(s) *2,12,26,30 and 34* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 November 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 10/253,988.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/4/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. Figures 29-35 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated (see e.g. the specification from page 10, line 11 through page 11, line 1). See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "fourth SAW resonator...located" between the input or output terminal and the first SAW resonator as required by claim 10 (i.e. the fourth SAW resonator 26 is only shown between two of the first/series SAW resonators in Figs. 6 and 8); and "a capacitance element" located in any of the positions recited in claim 11 (i.e. there is no "capacitance element" per se in the Figs. 6 and 8 embodiment to which independent claim 8 is drawn), must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate

prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities:

On page 1, line 7, "RADA" is non-standard notation in the art (i.e. at least in English), and it appears that "RADA-type" should correctly be - - ladder-type - -. This correction should be made throughout the entire specification at least also at: page 5, lines 11-12; page 13, line 24; page 18, line 24; page 22, line 32; page 26, lines 29 and 31; and page 35, line 32. This list may not be exhaustive.

Appropriate correction is required.

Claim Objections

4. Claim 5 is objected to because of the following informalities: In claim 5, on line 2, "RADA-type" should be - - ladder-type - -. Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 3 and 4 are rejected under 35 U.S.C. § 102(b) as being anticipated by Ushiroku U.S. 5,999,069.

Fig. 6 of Ushiroku discloses a surface acoustic wave (SAW) element comprising: a serial arm between input/output terminals 2a and 2b; two serial arm side SAW resonators 22 and 23 located in the serial arm with the serial arm also positioned between the two serial arm side SAW resonators. Note that it is the Examiner's position that the "serial arm" extends all the way from the input terminal 2a to the output terminal 2b as recited on line two of claim 1, and the "serial arm" is not limited to being only between the two serial arm resonators as appears to be claimed on lines 4-5 of claim 1. That is, as the claim is now murkily worded, the parallel resonators can be connected to the serial arm anywhere between the input/output terminals and not just between the two serial arm resonators as shown in Applicant's Fig. 2. Ushiroku further shows at least three parallel resonators 25-27 formed between the serial arm and reference potential. Ushiroku modifies the prior art, wherein the predetermined resonant frequency of the serial arm resonators corresponds to the anti-resonant frequency of the parallel arm resonators (see e.g. col. 2, lines 5-12), in order to provide additional attenuation in the rejection band (col. 2, lines 40-43) by providing at least one parallel

resonator with a different resonant frequency from that of the other parallel resonators without moving the anti-resonant frequency thereof so the pass band characteristics are not detrimentally affected (see col. 9, lines 25-43).

Regarding claims 3 and 4, although not shown, Ushiroku discloses its SAW filter element for use in a SAW mobile communication device being a branching filter with two SAW filter elements having different transmitting and receiving band center frequencies (see col. 4, lines 39-47).

7. Claims 5 and 6 are rejected under 35 U.S.C. § 102(b) as being anticipated by Wu JP 11-330904.

Fig. 1 of Wu discloses a SAW device being a mobile phone (see section [0001]) in which a SAW element is mounted, the SAW element including a ladder filter circuit having a serial arm between input/output terminals 41-0 and 41-4 with a plurality of first series SAW resonators 40S, and a plurality of parallel arms between the serial arm and reference potential 65 with a plurality of second parallel SAW resonators 40P, wherein the resonant frequency of the series resonators corresponds to the anti-resonant frequency of the parallel resonators (see Fig. 6), and a capacitance means being, for example, capacitor 50S-23 is "located between" the parallel arms nearest the input and output terminals. Note that the broad terminology "located between" requires no specific electrical connections, and also the capacitor 50S-23 is electrically connected between the two parallel arms at nodes N1 and N2. Regarding claim 6, the capacitance means 50S-23 is formed on the SAW element piezoelectric substrate [Fig. 1(a)].

8. Claims 8-11, 13, 14, 27-29 and 31-33 are rejected under 35 U.S.C. § 102(b) as being anticipated by Ehara et al. U.S. 5,905,418.

Fig. 25 of Ehara et al. discloses a SAW element comprising: a first wiring portion (a.k.a. series arm) between terminals IN and OUT; a plurality of second wiring portions (a.k.a. parallel arms) between the series arm and a reference potential terminal E; at least two single unit elements each comprising a first/series SAW resonator 114/118 having a second/parallel SAW resonator 120/124 at an input side thereof and a third/parallel SAW resonator 122/126 at an output side thereof, and each unit element having the reference potential sides of second and third parallel SAW resonators connected to each other at a connection point/node and a corresponding inductance element 128/130 (see col. 10, line 6) located between the connection point and reference potential terminal E. Regarding claim 9 and the resonant and anti-resonant frequencies of the resonators, Ehara et al. is modifying the prior art ladder filter of Fig. 8 such that the resonant frequency of the series resonators and the anti-resonant frequency of the parallel resonators must inherently substantially correspond to each other in order to form a usable band pass filter as evidenced by other art of record and as also admitted by Applicant (see Applicant's specification at page 14, lines 13-20).

Regarding claim 10, Fig. 25 of Ehara et al. also discloses a fourth resonator 116 between two first/series resonators 114 and 118, and resonator 112 can be considered a fourth resonator between the first series resonator 114 and the input terminal. Regarding claim 11, since the equivalent circuit of the fourth SAW resonators 112 and 116 is an LC resonant circuit and because SAW resonators have both electrostatic and

motional capacitance values, these resonators can also be considered "capacitance elements" by the broadest interpretation of the term. Regarding the SAW device and branching filter of claims 27-29 and 21-34, see Fig. 1.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claim 7 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Wu JP 11-330904 taken alone.

Wu discloses the invention as discussed above, except for disclosing the SAW device of the mobile phone (see section [0001]) specifically being a branching filter.

As evidenced by numerous other references of record, the Examiner takes Official Notice that it would have been extremely well known in the SAW filter art to use such SAW filter elements in branching filters (a.k.a. SAW duplexers).

Consequently, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the SAW device of Wu, if even necessary, such that it would have been mounted and used in a portable phone as a duplexer in view of the explicit suggestion by Wu to use it in a portable phone (see section [0001]) and wherein such SAW filters would have been extremely well known by

one of ordinary skill to be used as SAW branching filters and/or IF filters in such portable phones.

Allowable Subject Matter

11. Claims 15-20 are allowable over the prior art of record.

12. Claims 2, 12, 26, 30 and 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The following is a statement of reasons for the indication of allowable subject matter:

Regarding independent claim 15, the prior art of record does not disclose or fairly suggest a SAW device comprising flip-chip mounted SAW elements with a "first SAW element...having input and output terminals which are formed in one...side of a central axis of said piezoelectric substrate" (see lines 5-7) and a "second SAW element...having input and output terminals which are formed in the side remote from said first SAW element..." (see lines 10-13). Regarding claim 2, the prior art of record does not disclose or fairly suggest a SAW element having each of the recited features and especially having an inductance connected to the connection point of parallel arm resonators (claim 2), and also wherein one of the parallel arm resonators has a different resonant frequency (claim 1, the last two lines thereof). Regarding claim 12, no second inductance element as recited is shown or suggested by the prior art.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Regarding the invention of claim 1, Maehara et al. U.S. 6,570,470 (see the Title); Taniguchi et al. U.S. 6,208,224 (see the Title); and Taniguchi U.S. 6,489,863 (see col. 9, lines 36-40) each disclose changing the resonant frequency of at least one parallel resonator. Selmeier et al. U.S. 6,351,197 also discloses changing the resonant frequency by changing the finger period of resonators in a SAW ladder filter to provide improved band pass filter edge steepness (see the abstract).

Regarding claim 2, the closest art is Noguchi JP 10-93382 (see Fig. 1) which shows an inductance element connected to a common node of the parallel resonators.

Kuroda et al. JP 9-261002 also shows (Fig. 8) inductors of resonant circuits 91-94 connected to a common connection of the parallel resonators.

Regarding claim 5, Kommrusch U.S. 5,933,062 discloses (see Figs. 3, 5 and 8) a SAW ladder filter in a duplexer with a capacitance means 44 (e.g. parallel to series resonator 34) "located between" the two parallel arms. Also, Ou et al. U.S. 5,963,113 discloses a SAW ladder filter with an impedance matching resonator 52 (see Fig. 22) that is a "capacitance means" since SAW resonators are the equivalent of LC elements.

Taniguchi et al. U.S. 6,150,904 discloses impedances between parallel arm resonators and ground potential (see Fig. 19) as in Applicant's Fig. 6.

Plessky et al. U.S. 5,682,126 (Figs. 2E and 11B) and U.S. 6,043,585 (Figs. 3b and 4b) each show a SAW ladder filter that, if wire bonded, provides a filter similar to Applicant's Fig. 6.

Selmeier U.S. 6,747,530 and Ikata U.S. 6,369,672 each disclose various SAW ladder filters with inductances coupled to the parallel arm resonators.

Regarding claim 15, Nishizawa et al. U.S. 6,469,593 discloses forming the input and output terminals of a SAW ladder filter as far from each other as possible (i.e. diagonal corners in Figs. 10A and 10B) and so, not on one side of the center axis. Igata et al. JP 2001-127589 discloses some typical layouts of SAW filter terminals of a SAW duplexer (see Figs. 5-8 and 10).

Also regarding claim 15, Takata et al. U.S. 6,557,225 (Fig. 4B), Kadota et al. U.S. 6,297,712 (Fig. 4), Davenport U.S. 5,486,800 (Fig. 3), and Yatsuda JP 1000-91880 (Figs. 1 and 2) each disclose SAW filters with the input and output terminals on the same one side of a center axis. However, there is no teaching that when using such filters in a duplexer, the two filter chips are arranged with the input/outputs of one chip farthest from the input/output of the other chip.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara Summons whose telephone number is (571) 272-1771. The examiner can normally be reached on M-Th, M-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal can be reached on (571) 271-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

bs
October 12, 2004

Barbara Summons

BARBARA SUMMONS
PRIMARY EXAMINER